Microwave irradiated coconut shell-activated carbon for decolourisation of palm oil mill effluent (POME)

ABSTRACT

The study was based on the adsorption principle of colour removal from POME using natural bio-sorbents Coconut Shell activated carbon (CS-AC) pre-treated by microwave irradiation. The effect of operating parameters such as pH, adsorbent dosage, and contact time was varied at different ranges: 2-8.5; 1-6 g and 1-8 hrs, respectively. It was observed that colour adsorption increased with increase in contact time. The maximum uptake of colour by the adsorbents occurred at pH 2. Also, the maximum percentage of colour removal of 95% was obtained at the optimum conditions for coconut shell-microwave (CS-MW) of 5 g/100 mL dosage, 5 hrs contact time and pH 2. The Freundlich and Langmuir isotherm linear model showed a strong correlation with the experimental data with an R 2 value of 0.9175 and 0.9892 for each of the respective model. This implies that the Langmuir isotherm model gave a better fit as indicated by the R 2 value. It can be concluded that the CSAC has a potential to be used as bio-sorbent for POME decolourization.

Keyword: Coconut shell; Activated carbon; Microwave; Decolourization; POME; Adsorption isotherms